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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/856,924	05/30/2001	Nobuaki Hashimoto	109681	6373

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EXAMINER

TRAN, TAN N

ART UNIT PAPER NUMBER

2826

DATE MAILED: 06/18/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/856,924

Applicant(s)

HASHIMOTO ET AL.

Examiner

TAN N TRAN

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 May 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) 20-32 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### **Election/Restriction**

1. Applicant's election with traverse of Group I, claims 1-19 in Paper No. 8 is acknowledge. The traversal is on the ground(s) that "the Restriction Requirement does not address the unity of invention and thus does not even provide the correct analysis" and "the subject matter of all claims 1-32 is sufficiently related that a thorough search for the subject matter of any one group of claims would encompass a search for the subject matter of the remaining claims". These are not found persuasive because referring to the restriction requirement set forth in the Office Action paper no.7, it clearly shows that the alternative method proposed by the examiner would be distinct from the process claimed. Applicant did not show the alternate method was incorrect. Additionally, the search is not coextensive as evidenced by the different fields of search for the process and product as cited in the previous restriction requirement. Furthermore, Applicant has not provided a convincing argument that the materially different processes would not be suitable in producing the claimed device. Therefore, the election requirement is made final.

### **Oath/Declaration**

2. The oath/declaration filed on 05/30/01 is acceptable.

### **Claim Rejections - 35 USC § 112**

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 7-9, 13-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 7, lines 2-4, what does applicant mean by “a recognition hole is formed in the substrate at a position differing from the holes; and wherein a recognition pattern is formed over the recognition hole on the side of a surface of the substrate including the interconnecting pattern.”?

In claim 13, line 3, “the melting point” lacks of antecedent basis.

In claim 18, line 1, “the semiconductor device” lacks of antecedent basis.

#### **Claim Rejections - 35 USC § 102**

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-5, 10, 11, 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Otsuka (US 5,949,142).

With regard to claim 1, Otsuka discloses a substrate 4 including a plurality of holes and a surface over which an interconnecting pattern 4b is formed, part of the interconnecting pattern 4b

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being superposed over the holes; a semiconductor chip 2 disposed over another surface of the substrate 4 and including a plurality of electrodes to be positioned over the holes; and conductive members (4a,4c) comprises interlevel conductive bump provided within the holes for electrically connecting the electrodes to the interconnecting pattern 4b. (Note lines 4-5, columns 4-5, figs 1, 3 of Otsuka)

With regard to claim 2, Otsuka discloses a resin 6 is provided between the substrate 4 and the semiconductor chip 2. (Note figs 1, 3 of Otsuka).

With regard to claim 3, Otsuka discloses the resin is an anisotropic conductive material 6 containing conductive particles 6a. (Note lines 13-17, column 4, figs 1, 3 of Otsuka).

With regard to claim 4, Otsuka discloses the part of the interconnecting 4b closes the holes. (Note figs 1, 3 of Otsuka).

With regard to claim 5, Otsuka discloses the interconnecting pattern 4b includes a plurality of interconnecting lines; and wherein two or more interconnecting lines extend over each of the holes.

With regard to claim 10, Otsuka discloses the conductive members (4a, 4c) are a plurality of layered bumps. (Note figs 1, 3 of Otsuka).

With regard to claim 11, Otsuka discloses the bumps (4a, 4c) include first bumps 4a formed on the electrodes and second bumps 4c formed on the first bumps 4a. (Note figs 1, 3 of Otsuka).

With regard to claim 17, Otsuka discloses the semiconductor chip is mounted face-down to the substrate. (Note figs 1, 3 of Otsuka).

*Claim Rejections - 35 USC § 103*

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 6, 12, 18, 19, 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Otsuka (US 5,949,142).

With regard to claim 6, Otsuka discloses all claimed invention as in claim 1, except the other surface of the substrate 4 is roughed. However, it would have been obvious to one of ordinary skill in the art to form Otsuka's case having surface of the substrate 4 is roughed because such element 4 is conventional in the art in order to make the resin 6 is more stable.

With regard to claim 12, Otsuka discloses all claimed invention as in claims 1 and 10, except at least the first bumps are ball bumps. However, it would have been obvious to one of ordinary skill in the art to form Otsuka's case having at least the first bumps are ball bumps in order to form the conductive particles in a thermosetting resin for electrically connecting to the semiconductor chip via an insulating layer more easy.

With regard to claim 16, Otsuka discloses all claimed invention as in claims 1 and 11, except the first bumps and the second bumps are formed of the same material. However, it would have been obvious to one of ordinary skill in the art to form Otsuka's case having the first bumps and the second bumps are formed of the same material in order to simplify the processing steps.

With regard to claims 18 and 19, Otsuka discloses all claimed invention as in claim 1, except a circuit board and electronic instrument provided with the semiconductor device. However, it would have been obvious to one of ordinary skill in the art to form Otsuka's case having a circuit board and electronic instrument provided with the semiconductor device because such structure of Otsuka is conventional in the art in order to a chip size package is constituted by a chip on which an integrated circuit is formed.

#### **Allowable Subject Matter**

6. Claims 7-9, 13-15 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Claims 7-9, 13-15 are allowable over the prior art of record, because none of these references disclose or can be combined to yield the claimed invention such as a recognition hole is formed in the substrate at position differing from the holes; and wherein a recognition pattern is formed over the recognition hole on the side of a surface of the substrate including the interconnecting pattern in claim 7, and the second bumps are formed of a metal which has a melting point lower than the melting point of the first bumps in claim 13.

#### **Conclusion**

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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Kim et al. discloses a substrate including a plurality of holes and a surface over which an interconnecting pattern is formed, part of the interconnecting pattern being superposed over the holes; a semiconductor chip disposed over another surface of the substrate; and conductive members provided within the holes for electrically connecting the chip to the interconnecting pattern.

10. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Tan Tran whose telephone number is (703) 305-3362. The examiner can normally be reached on M-F 8:30AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (703) 308-6601. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for after final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

TT

June 2002

  
Minh Loan Tran  
Primary Examiner